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THE fall of the Rockford Court House is a yet more serious warning than the casualty at New York, of the dangers of irresponsible management. The building was an elaborate one of cut stone, and its principal feature was to be a square French dome rising above the roof and set on an attic of stone. This dome and its attic rested in front on the outer wall of the building, but the space beneath it was part of a large court-room; and in order to have it unobstructed the return walls and rear wall which should have carried the dome were omitted in the second and third stories, and two iron columns about thirty feet high were set under the corners. They carried girders, bearing the brick walls in the story above on which the dome rested. The iron columns stood upon brick wall or piers, also thirty feet high, in the first story. It was these piers apparently that gave way suddenly when the whole attic of the dome, almost ready for the superstructure, with the brick walls, girders, and columns under it, fell into the cellar with about two dozen men who were at work on it, and of whom one-half were killed. At our time of writing the immediate cause of the fall is not known; but the construction was evidently of a very venturesome kind, such as should only have been carried out with extreme care and under watchful and skilful superintendence. It resulted too, it may be said, from a violation in the design of the received canons of good architecture by introducing a useless feature in a position where it was quite out of relation with the disposition of the plan of the building. The superintendence of the building was not given to the architect, Mr. Gay of Chicago, who had only visited it at intervals as he had been called for in consultation. The building-committee had appointed one of themselves as superintendent, — a very objectionable proceeding, apart from the question of his capability, of which at present we know nothing.

THE people of Illinois have suffered much at the hands of many architects. It is hard to say whether the quarrels over the Chicago Court House have been more lamentable or more ludicrous; the outcome of them has at least been unlucky enough. The State has spent twice as much as it expected to on its new State House, and finds that a considerable sum is still needed to finish it. Even before the deplorable casualty at Rockford, the patience of the Legislature seems to have been exhausted. The feeling of the neighboring community of Indiana is shown pretty well by the character of the bill which provided for building their new State House at Indianapolis, and which we have already noticed. The Illinois Legislature has bent itself to its work in the passage of three bills, two of which have at our present writing passed the Senate, and one the House, — for the protection of travellers from hotel fire, for the punishment of the architects and builders of faulty buildings, and of building-commissioners who exceed their estimates. The first obliges the proprietors of all hotels to put in every room above the second story a wire rope ladder which will reach the ground, with a proper fastening. The second punishes with fine or imprisonment, or both, any architect or builder through whose negligence in designing or constructing a building loss of life or of property shall occur. The third deals similarly with any building-commissioner or other official in charge of state building operations, who shall order or allow any changes in the design of the buildings under his charge whereby their authorized cost shall be exceeded.

OF the first of these measures we have already told our opinion in speaking of the similar law in Wisconsin; that it was a sorry and rather absurd substitute for requirement of reasonable planning and substantial construction. We do not believe that it will ever be enforced for any length of time, or be found to be of practical value. As for the bill for the punishment of negligent architects and builders (we trust it includes incompetent ones as well), we have always argued in favor of holding such persons to a strict accountability, and of applying criminal penalties where there is loss of life; but to confound sacrifice of life and sacrifice of property as similar offences, subject to similar penalties, seems to us extremely inconsiderate. Setting aside the entire incommensurability of the two injuries, it is to be remembered that the security of life is the special charge of the state in a way that the safety of investments is not. The man who employs an architect intrusts him with what may be called a business investment. He selects his architect himself, and if there is any risk he voluntarily incurs it for his own advantage, though he may not know its extent. The proper remedy here, as in case of any unskilful management of property by an agent, would seem clearly to be found in a suit for damages, or in a forfeiture of commission. The thing to aim at is to make the proprietor whole, and this is not to be accomplished by fine and imprisonment of the offender. But a man cannot be assumed to voluntarily risk his life for his own profit; and since when he is killed he cannot be made whole, it becomes the duty of the state to protect his life by affixing criminal penalties to the sacrifice of it. In the case of a falling building the risks are further discriminated by the fact that the persons endangered are commonly not the proprietors, but persons who have not selected the architect or builder, and for whose benefit he is not employed. Moreover, in fairness, such penalties belong equally to anybody to whom similar injuries are owing, and such a measure is not complete unless proprietors of buildings, through whose interference or negligence loss of life or bodily injury is incurred, as not unfrequently happens, are put in the same category as offending architects or mechanics.

OF the bill which punishes officials who exceed their building-appropriations, it may be said that it is hardly adequate for the difficulty, and that it may sometimes even prove mischievous. So long as building-committees are what they frequently are, they will be likely to select unsuitable or inadequate designs and unsatisfactory architects. And as long as legislatures fix the limits of cost of buildings in their appropriations by their own judgment, they will be in danger of making inadequate allowances. Building-committees are apt to learn their business as they go; to cut them off from opportunity to improve the buildings in their charge by changes which involve any increase of cost whatever, by a bill which makes a small transgression of the limit as much a misdemeanor as a great one, may be to tie their hands from doing the state good service. On the other hand, to leave commissioners unlimited discretion is to invite the evils which Illinois is now deploring. The difficulty is a perplexing one; but it is not going to the root of it to put the appropriations under lock and key. A better point to aim at would be to secure the selection of the right kind of architects and designs. The guiding principle is the same that would naturally be followed in looking out for the best professional assistance in any other important matter, — either to appeal to none but those who were beyond question pre-eminent in their vocation, or else to be guided by competent professional counsel in making a selection. The deliberate general verdict of a community as to who are its best men in a profession is entitled to some confidence; but the opinion of a random individual on a question of the qualifications of an architect or the

merits of his plan may not be worth a rush, and the judgment of most committees is of questionable value. If important state works were never intrusted to any but the most eminent architects, or if one of these were secured as counsellor and his advice allowed its due influence, whenever any general competition was permitted, our public work would probably be much better done than it is, and the provisions of the law in question might be effective if they were found necessary.

SINCE the failure of Maretzek's scheme for a grand opera-house in New York, a new project for utilizing the Hippodrome lot has been devised. The projectors of the great Music Hall for Mr. Theodore Thomas's orchestra have just issued a prospectus which announces that they have secured a long lease of the land from Mr. Vanderbilt, and invites subscriptions to the stock of the Thomas Garden Company (Limited) for the purpose of building a great winter-garden combined with what is intended to be, according to a familiar America formula, the finest music hall in the world. The lot occupies the whole block between Twenty-sixth and Twenty-seventh Streets and Fourth and Madison Avenues, and is in shape rather more than a double square, its longer axis east and west, from avenue to avenue. A late number of the New York *Tribune* gives a description of the building which it is proposed to put upon the lot, illustrated by a plan and section from the designs of Mr. Alfred H. Thorp, architect, which are contrived with much cleverness. The lower story of the building, which will be twenty-five feet high, is to be occupied by shops. It is divided by two galleries or covered streets, twenty feet wide, crossing it from north to south and from east to west, and meeting in a circle at the centre, from which diverge also similar galleries to the four corners. The eight right triangles between these passages are to be divided into the shops, of which there will be a hundred and thirty, and which will, it is expected, be occupied for light retail business, such as is found in the well-known passages of Paris, and in the famous gallery of Victor Emanuel at Milan. The passages between the shops are made to correspond with the principal aisles and walks of the garden and music hall above, which gives an opportunity for lighting them with illuminating tile.

IN the centre of each long side (on the north and south) a great staircase leads to the second floor. In the middle of this is a circular stage for the musicians, with an organ. The two halves of the building are separated by a glass screen which abuts against the stage on either hand. In the eastern half is the great music hall, with a parterre and three tiers of galleries, quadrangular in plan, but with the rear end curved into a segment to follow the outermost of the concentric ranges of seats. Around the hall is a wide corridor or promenade, outside of which are grouped the various rooms of a great restaurant which occupies the whole periphery of the eastern half of the building. The whole western half is taken up by a garden covered by an enormous square dome, and with the outer walls so contrived that they can in the summer be thrown open to the air, and in the winter closed. Stairs at either end lead to a third-floor gallery or promenade, which connects with an exterior balcony running all round the building. The whole is to be built of iron and glass, and its estimated cost is half a million of dollars, of which it is said that a quarter has been pledged in advance. This seems rather a small estimate considering the great size of the building, — some two hundred feet by four hundred and more, — and the necessary difficulties of roofing so large a space and of providing a secure floor for a second-story garden with shops beneath.

IT would seem that we are only beginning to know what relics a departed civilization has left in our Rocky Mountain regions. We find in the Philadelphia *Bulletin* an account of certain discoveries in the Animas Valley in Colorado by members of the United States Geological Survey, which are of remarkable interest. Most visitors to the Centennial Exhibition probably noticed the photographs and models of the cliff dwellings in Colorado and Arizona, of which accounts were published last year by the Department of the Interior. Prof. Hayden's reports from the Animas Valley tell of far larger and more important buildings than were found among the cliff villages. The valley appears to have been densely inhabited, and is full of ruins of buildings of all sorts and sizes, in which are found a great variety of interesting things, pottery, hides, drawings, and undecipherable inscriptions. The buildings are built of stone of various kinds laid in clay, and some of them are enormous. We refrain from giving the dimensions, which are evidently recorded by an inexpert reporter. The two largest buildings that were examined were strikingly well preserved. Like all the Colorado dwellings, they had no outside doors on the ground level, but there are ranges of port-holes, as it were, a foot square. The scale of parts is so small as irresistibly to suggest that they were the work of a small race of men, the rooms into which they are subdivided being mostly from eight by ten to twelve by fourteen feet, and the doorways being only two by four feet. The doorheads are bridged by cedar poles, on which the masonry is laid. The buildings still stand four stories high, the roofs being burned away, but some of the floors left standing. The floors rest on timbers of about eight inches [square?] set some three feet apart. Upon these are laid a layer of cedar poles, on these a layer of thin slips of the same wood, then a layer of cedar bark, and on this a layer of earth three inches deep; on this again another layer of bark and then of earth, upon which were remains of a sort of carpet of coarse grass. In the rooms that have not been exposed to the weather, a coating of whitewash still remains, and on it are drawings of men and various animals, as well as inscriptions. There are indications that there was once a balcony along one front of each of these two great buildings. The Indians of the country have a tradition that their forefathers came to their present abodes "five old men's ages" ago, and found these dwellings then in their present condition. The climate of Colorado is exceptionally dry and antiseptic, but it is difficult to believe that such floors as are here described could last five hundred years even there.

THE NEW YORK POST OFFICE DISASTER.

IT seems pretty clear that however blame may be distributed for the disaster at the New York Post Office, there was sufficient cause for the fall of the truss in the way in which it was hung. It was not a Howe truss, as was said in the newspapers at the time of the accident, but a suspension truss of the simplest type, with both top and bottom chords of full length, vertical struts, and single oblique suspension-bars, in four panels, as appears by the letter of a correspondent in another column. The outer end rested upon the upper plate of the mansard, and the inner upon the main partition wall. In such a truss all the strains are finally carried to the ends of the top chord, and the support must be applied there; the object of extending the bottom chord across the extreme panel being only to give opportunity for steadying the truss at the bottom, to keep it in a vertical plane. If the support is applied at the bottom of the truss, it must be transmitted directly to the top by stout struts, which serve not as integral parts of the truss, but merely as shores to prop the upper chord; and which need to be laterally braced at top and bottom to prevent their being overturned. In the original trusses of the building the upper chord was bolted to the upper plate of the mansard with angle irons at the outer end. The end strut or shore here was carried down to the floor, resting on a bearer, and framed into a triangular brace with an eight-inch channel-bar serving for the contiguous rafter of the mansard, the end of the lower chord being bolted to it, so that the weight on the truss was divided between the strut and the rafter. The strut at the inner end was built solidly its whole height into the main partition wall which carried the floors and roof; and the roof-beams which rested on the top chord were framed and bolted to it. According to the testimony of Mr. Hill, and of Mr. Schumann, the engineer in charge of iron construction in his office, it was discovered after the fall of the new truss that the outer end of it had never been bolted to the roof-plate, that the roof-beams were not bolted to the truss, and that the eight-inch bar and the triangular bracing at that end had been omitted; so that the whole truss was poised upon the top of the end strut, which was nineteen feet long and without any lateral stiffening or

support whatever. As soon as the weight was let upon it the strut bowed, and the whole came down. Neither Mr. Schumann nor Mr. Hill had examined the truss, Mr. Schumann being attached to the office at Washington, while Mr. Hill, on his way to Albany, had looked at it hastily after it was in place, trusting that his superintendent, Mr. Oakshott, had assured himself that every thing was right. Mr. Oakshott appears not to have understood the construction or placing of the truss, but confided in the contractor who made it, and in his own foreman, who however knew no more than he himself. In whom the contractor put his confidence, does not appear.

The alterations thus made without proper authority show a deplorable incapacity in whoever had actual charge of the work. To exactly apportion the blame among the different persons who are concerned, is a difficult and thankless task which may be left to those whose duty it is. The technical responsibility is what concerns the public, and that ought to rest with the official who has the ultimate control of the work, that is, the supervising architect, unless he has by his system of administration deputed it to some one on whom it can be distinctly fixed. The case seems to have been just such a one as is liable to occur any day in any kind of business, in which the thing to be done is not difficult, and the method of procedure seems so much a matter of course, that supervising vigilance is thrown off its guard, and everybody takes it for granted that everybody else will do the right thing. Such cases are exactly those which require an effort to control. Those which involve difficulty or uncertainty enough to cause anxiety are pretty sure to be well looked after; but those which disarm watchfulness demand just the resolute oversight that makes the difference between thoroughly excellent and tolerably good administration. But nothing less than a thoroughly excellent administration should be required in an office which controls work of so much importance in respect of cost, public usefulness, and even personal safety, as does that of the supervising architect.

The truss which failed, though not a difficult one to construct, had an important and critical work to do. The drawings from which the others had been made were, as we understand it, on file in the Supervising Architect's office; but the contractor was left to construct it from his own notes and measurements of the others taken on the ground. The contractor's agreement was made without a written contract, and apparently without detailed instructions of any kind. We have not found any thing to show that there was a clear understanding as to whether the contractor or the superintendent should provide for the proper fastening of the truss when it had been put in place. It appears that for some reason of convenience, the truss was made shallower and therefore weaker than its fellows, and that the dimensions of some of the bars were changed, although it is not shown that this led to actual breaking of the truss itself.

There is considerable variation in the findings of the different juries which have investigated the disaster. The coroner's verdict seems to us to bear with unreasonable severity upon the former Supervising Architect, Mr. Mullett, under whom the Post Office was built. To turn away from the direct and conspicuous causes of the disaster in order to visit the chief condemnation on lesser preliminary faults takes away from the verdict the judicial character on which its value should rest. It says: —

"The immediate cause of the falling of said portion of the roof was improper and insufficient construction; but the primary cause of the disaster is attributable to the incompetency of the agents of the Treasury Department, charged with the erection and completion of the building. . . . An excessive quantity of concrete was used in the covering of the roof, and the load thereby imposed upon the iron roof exceeded the weight for which the iron constructed was originally designed, by more than three hundred per cent. All of this is owing to the incompetency on the part of A. B. Mullett, the Supervising Architect in charge at the time the roof was designed, and his local employees."

There is no mention of any person to whom the blame of the disaster belongs, excepting Mr. Mullett; yet the facts are, that so long as the building remained as Mr. Mullett designed it, no harm came to it. The verdict adds that, —

"It appears that on the removal of the wall on the fourth story the remainder of the wall on the sixth story was left standing by order of A. B. Mullett, supported, according to his direction, by two light fifteen-inch iron beams, competent to carry only one-quarter of the weight imposed upon them; that this wall was recently taken out to be replaced by an iron truss . . . but no special drawing was made for the new truss and its outer support. . . . It appears that neither the local superintendent nor said iron firm had the necessary technical information to correctly understand the functions of the truss, or how such truss should be constructed, and that in consequence its support gave way as soon as the temporary props supporting the roof-beams were removed."

Mr. Mullett has testified that when he resigned his office at the time the original alteration was undertaken and the beams put in, he recommended that the upper portion of the altered wall should be removed with the rest, and a truss substituted; and that nearly two years later, when under a new appointment he inspected the building, he renewed his recommendation, which was then adopted. The report of the special commission affirms that the suggestion of the truss was made by Mr. Oakshott and adopted by Mr. Mullett. We do not know the evidence that led the commissioners to this conclusion. The experts in the coroner's jury are men whose knowledge and professional ability entitle them to deference; yet we are puzzled to find them reporting that the iron roof carried a load three hundred per cent greater than it was designed for. Our correspondent computes the weight at eighty pounds per square foot; and we have not anywhere seen it assumed at more than a hundred pounds. It is hardly conceivable that any tolerably capable constructor should design an iron roof for a load of only twenty or twenty-five pounds per foot; and the analysis of the original truss in our columns allows for a breaking weight of about a hundred and ninety pounds.

There are some points in the construction of the original trusses which are worth noting; although they have no direct bearing on the accident, they illustrate in some degree the findings of the juries upon it. The first thing that strikes us in examining the diagrams furnished by our correspondent, which we suppose to be authentic, is the singular variation in the proportioning of the different members to their work. The ultimate strength of the top chord is nearly seven times and that of the bottom chord nearly twelve times as great as the actual stress to which it was exposed, while for the suspension bars of the end panels the ultimate strength was only about two and one-third times the actual stress. Convenience in mechanical working often requires an excess of material in some parts of a structure; but in any part a factor of safety of only two and one-third would be considered by prudent engineers unreasonably small. The excess of strength in the upper chord was given no doubt to add to the rigidity of that member because the roof-beams bore upon it at unsupported points instead of resting above the struts of the truss. One is tempted to wonder why the truss was not divided into five panels, so as to bring the struts under the beams, and by giving less obliquity to the suspension bars lessen the strain upon them.

The commission appointed by the postmaster of New York have reported to the Secretary of the Treasury that the ceiling of the court-room and the floor under the fallen truss is not strong enough, and is in danger of giving way. It is not to be forgotten that this ceiling bore the fall of the roof upon it in safety, and that it was strong enough to support the shoring on which the roof rested during the placing of the unlucky truss, although it was of course not designed for such a function. Still the replacing of the supporting partition by the two fifteen-inch beams was an evident error. They have deflected five inches or more under the weight of the floor and the shock of the fall. It was stated, however, in the evidence before the coroner's jury that they were put in by Mr. Steinmetz, Mr. Mullett's superintendent, on his own judgment. Nevertheless the framing of such a floor and ceiling untrussed, with a bearing thirty-six feet, is a thing that requires great caution, and Mr. Mullett is probably officially responsible for the way in which this is done, as he is for the narrow margin of safety with which the original trusses were designed, and for the strength of the $10\frac{1}{2}''$ beams in the roof, whose bearing was very long, and which it is said showed deflection, though there is no indication that this had any ill result.

On the whole, the presentment of the Grand Jury, which we give in another column, seems to us to cover the merits of the case more fairly than any other that we have seen. Its most significant points are these: —

"The accident may be said to have resulted from the adoption of defective work without previous inspection or approval by any quali-

fied persons. Neither Dougherty nor Oakshott was a proficient architect or engineer and neither of them could claim or did claim when before us to be capable judges of the sufficiency of the truss. It seems to us that if the Supervising Architect cannot personally superintend all the structures under his charge, the position occupied by the supervising inspector should be filled by a person of professional attainments superior to those of its present incumbent.

"The Supervising Architect in this case seems to have put a confidence in the supervising inspector, to which from his skill and judgment he was not entitled, and the supervising inspector in turn to have been similarly over-confident in his foreman. It may at least be suggested that Government has either shown an excess of confidence in the person selected to the position of Supervising Architect, or has imposed upon him an excess of duty. We are willing to believe the latter to be the case."

It is pretty clear that there was an excess of confidence among the persons in charge of the alterations, and that Mr. Hill's examination of the truss before the shores were taken away was not what it should have been unless he had absolute and well-founded trust in the capability and vigilance of his inspector. It is pretty clear that the inspector was not qualified to judge of such a construction as he was superintending. No careful architect will defend the ordering of so important a piece of construction without furnishing full drawings and careful directions. But an instance of negligence is not a proof of incompetence, and no one who is familiar with the organization of the office of the Supervising Architect can doubt that more is laid on him than one man can properly accomplish.

THE ILLUSTRATIONS.

HOUSE AT LONG BRANCH, N.J. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(52 William Street, New York.)

THIS house is building for Bryce Gray, Esq., at Long Branch, N.J. It is comparatively inexpensive, depending for its effect upon the disposition of its parts, and not on the use of surface ornament. It is finished in the interior with light woods, and the furniture, designed by the architects, will be in harmony with the general finish of the various rooms.

HOUSE FOR DR. BUMSTEAD, NEW YORK. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

(2 Pemberton Square, Boston, Mass.)

HOUSE AT PRIDE'S CROSSING, BEVERLY FARMS, MASS. MESSRS. CABOT AND CHANDLER, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

THE OLD AND NEW TRUSSES OF THE NEW YORK POST OFFICE.

See article, "The Fall of the Roof of the New York Post Office."

CORRESPONDENCE.

THE POST-OFFICE DISASTER.

NEW YORK.

THE triple investigation into the matter of the broken Post Office truss is over. The coroner's jury in the regular course of procedure was duly called to determine the cause of death; the board of examination convened at the instance of the Secretary of the Treasury, in whose department the duty of public building construction lies, have reported; and the Grand Jury of the United States Circuit Court, criminal branch, have sent in their presentment on the subject. Those best able to form an opinion preferred to defer the utterance of their views until the facts touching the construction of the truss and its surroundings were laid before them. In the evidence offered, this has been pretty thoroughly done, and leaves little doubt that there had been from the very highest official in the Federal architectural bureau, down through his subordinates, a shifting of the responsibility, until the real inspection of the work, such as it was, came to be left in the hands of ordinary foremen fit only to oversee the hauling and pulling of common laborers. It was a clear case of general supervision carried to its natural sequence where clearly defined responsibility is not exacted.

The first witness called on the coroner's proceeding was Thomas H. Oakshott, the representative of Mr. Hill in the care of the general government buildings in this city. Mr. Oakshott is by trade a stone-cutter, and he has never gained that thorough knowledge of building which would fit him for the post assigned him. His operations in the case of the truss were limited to ordering Heuvelmann, Haven, & Co. to supply a truss similar to others in the building, and directing his foreman Dougherty to shore up the roof, and remove the brick wall whose work it was intended to impose upon the truss. Once or twice Mr. Oakshott passed under the truss, glanced up at it. Had he examined it ever so closely, there is no evidence that he would have detected wherein Messrs. Heuvelmann, Haven, & Co. had slighted their work, but even this minimum of duty was not performed. As a matter of fact, it is not at all certain that the iron firm intended to supply the several attachments found with the old truss. In the old, an eight-inch rolled-iron rafter rises at the outer end of the truss, and is bolted into the upright leg on which the truss stands. The memoranda of pieces proposed by Mr. Haven did not include this important strengthening adjunct, yet its absence was either ignorantly or carelessly overlooked. Supervising architect Hill testified to what little he remembered of the truss before the accident, and ever so much examination since the smash. Mr. Schumann, the civil engineer attached to the office, charged with the mathematical computations necessary, was the only witness appearing to possess a training which made his opinion worth the asking. In the case of this truss, however, he had not been consulted, and was only useful in pointing out the defects of the affair erected. Mr. Mullett was called, but he professed to have forgotten every thing he had ordered during his official term, retaining merely the general impression that whatever he had then ordered was right. The evidence of the contractor and workmen only went to prove that in this instance at least supervision by any one capable of exercising it was entirely absent. The presentation of the evidence which had occupied the sittings of three days was followed by a three hours' discussion by the jury, when the verdict was given.

"The coroner's jury duly sworn to inquire into the cause of the death of Dennis Fleming, Charles H. Robertson, and Patrick Johnson, find that they came to their death by the falling of a portion of the roof of the New York Post Office, on the first day of May, 1877.

"We further find the immediate cause of the falling of said portion of the roof to be from improper and insufficient construction; but that the primary cause of the disaster is attributable to the incompetency of the agents of the Treasury Department, charged with the erection and completion of this building, and that the United States Government is responsible for this calamity.

"We further find that an excessive quantity of concrete was used in the covering of the roof, and that the load thereby imposed upon the iron roof-beams and their support exceeds the weight for which the iron construction was originally designed by more than three hundred per cent; that all of this is owing to incompetency on the part of A. B. Mullett, Supervising Architect in charge at the time the roof was designed, and his local employees; and that the civil engineer, the only party appearing before us competent to design and compute methods of construction, has, according to the testimony, no authority in carrying out the construction (his functions are entirely advisory), and that the Supervising Architect and his employees, not themselves technically intelligent, omitted to recur to his advice when changes were made by their authority. It appears that on the removal of a wall on the fourth story, the remainder of the wall on the fifth story was left standing by order of A. B. Mullett, supported according to his direction by two light fifteen-inch iron beams competent to carry only one-fourth of the weight imposed upon them; that this wall was recently taken out to be replaced by an iron truss, and that the cost of the truss was reported to the Superintending Architect at Washington, D.C., by the local superintendent here, and the expenditure approved by him, but no special drawing was made for the new truss and its outer support; that the understanding between the local superintendent and the iron-workers was for a truss similar to another truss then in the building

"It appears that neither the local superintendent nor said iron firm had the necessary technical information to correctly understand the functions of the truss needed, or how such a truss should be constructed, and that in consequence its supports gave way as soon as the temporary props supporting the roof-beams were removed.

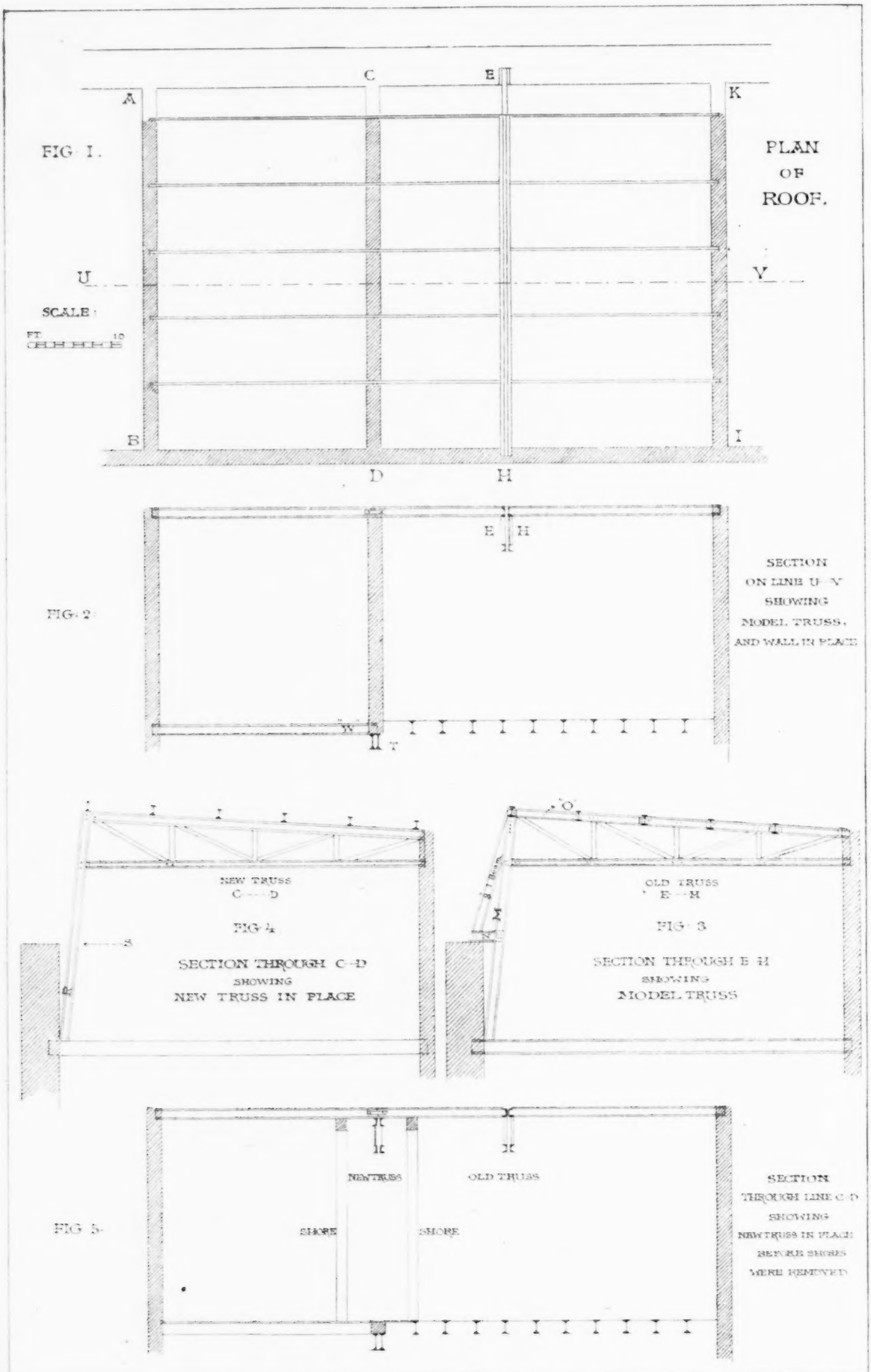
"Furthermore, we are of the opinion that the method now in vogue in the Treasury Department in Washington of designing and constructing government structures throughout the United States demands intelligence in local superintendents, in this or similar emergencies, which the Government has certainly not in this case been successful in securing.

'JOHN H. JACOBUS, *Foreman*, JOHN P. MAGOVERN, RICHARD M. UPJOHN, LEOPOLD EIDLITZ, HENRY FERNBACH, R. M. HUNT, HERMAN HERMAN, G. H. TAYLOR, WILLIAM H. BRYANT, VINCENT P. TRAVERS."

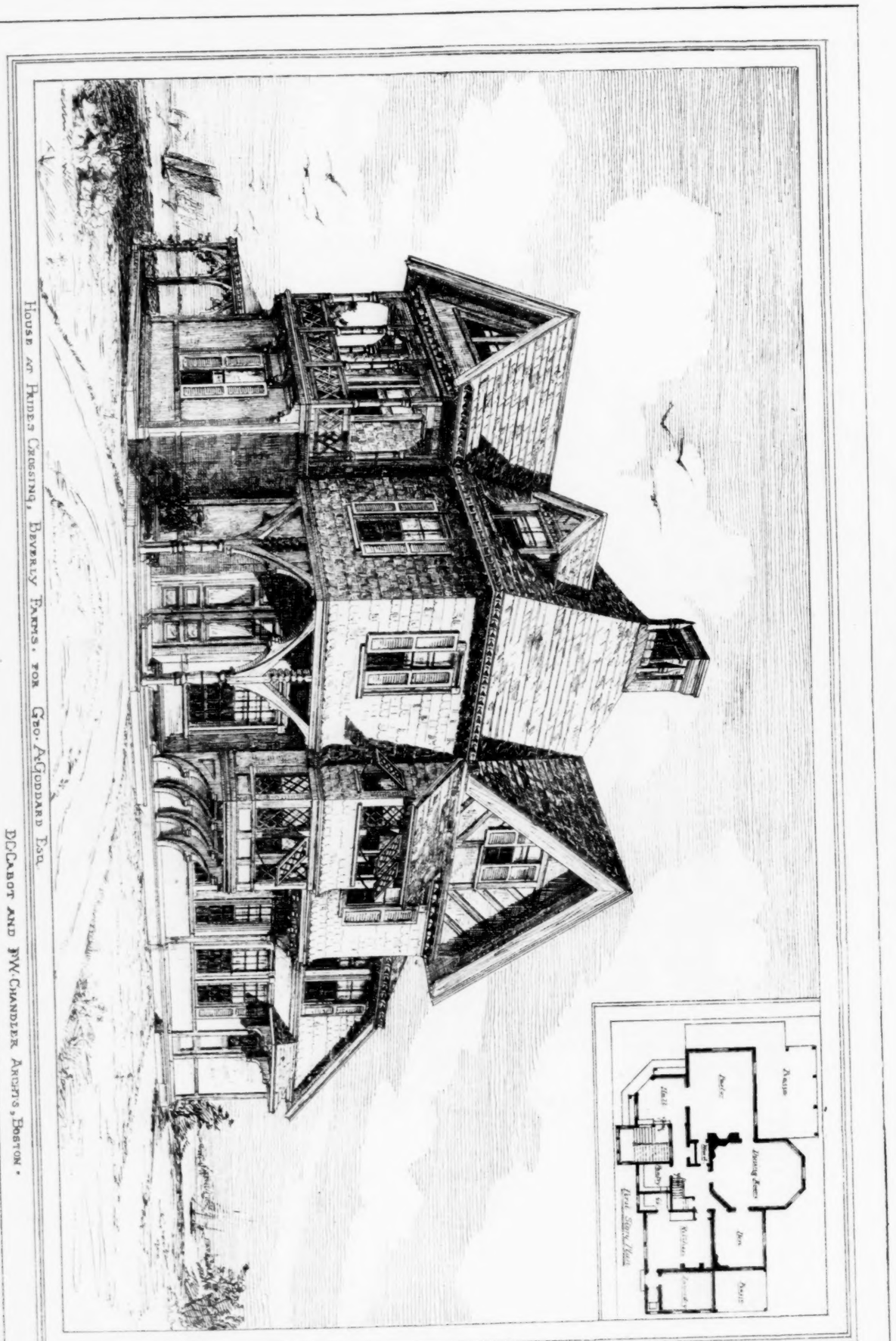
The United States Grand Jury's consideration of the case is included in a presentment to Judge Benedict, whose court-room lies immediately below that in which the break occurred. The presentment gives a very concise history of the case as follows: —

"Some months ago it was believed that the safety of this court-room demanded the removal of a brick wall which crossed the floor in the story immediately over it, and upon which the roof in part rested. A substitute for the wall was required to sustain the weight of the roof, and as such substitute a truss or combined girder was determined upon. Early in April a proposal to furnish the truss was received by Thomas H. Oakshott, supervising inspector of construction, from Messrs. Heuvelmann, Haven, & Co., and by him accepted, his action being subsequently approved by James G. Hill, Supervising Architect, The terms of the agreement were meagre, vague, and indefinite. The truss was to be a duplicate of one already in place, and which was considered adequate. The truss indicated as a model was maintained in position at its northern extremity both by a perpendicular support and by a connection through rivets and ties with one of the obliquely inclined rafters of the mansard, and was also bolted to the transverse beams of the roof. The truss furnished by the contractors was supported neither by a rafter nor by rivets to the beams above it. The professional testimony concurs that the fall of the roof was occasioned by these deficiencies.

"One thing is certain, — that the defects were obvious and apparent if the attention of a competent and experienced person had been drawn to them. As a matter of fact, the direction to remove the props that had sustained the roof while the truss was being adjusted was given



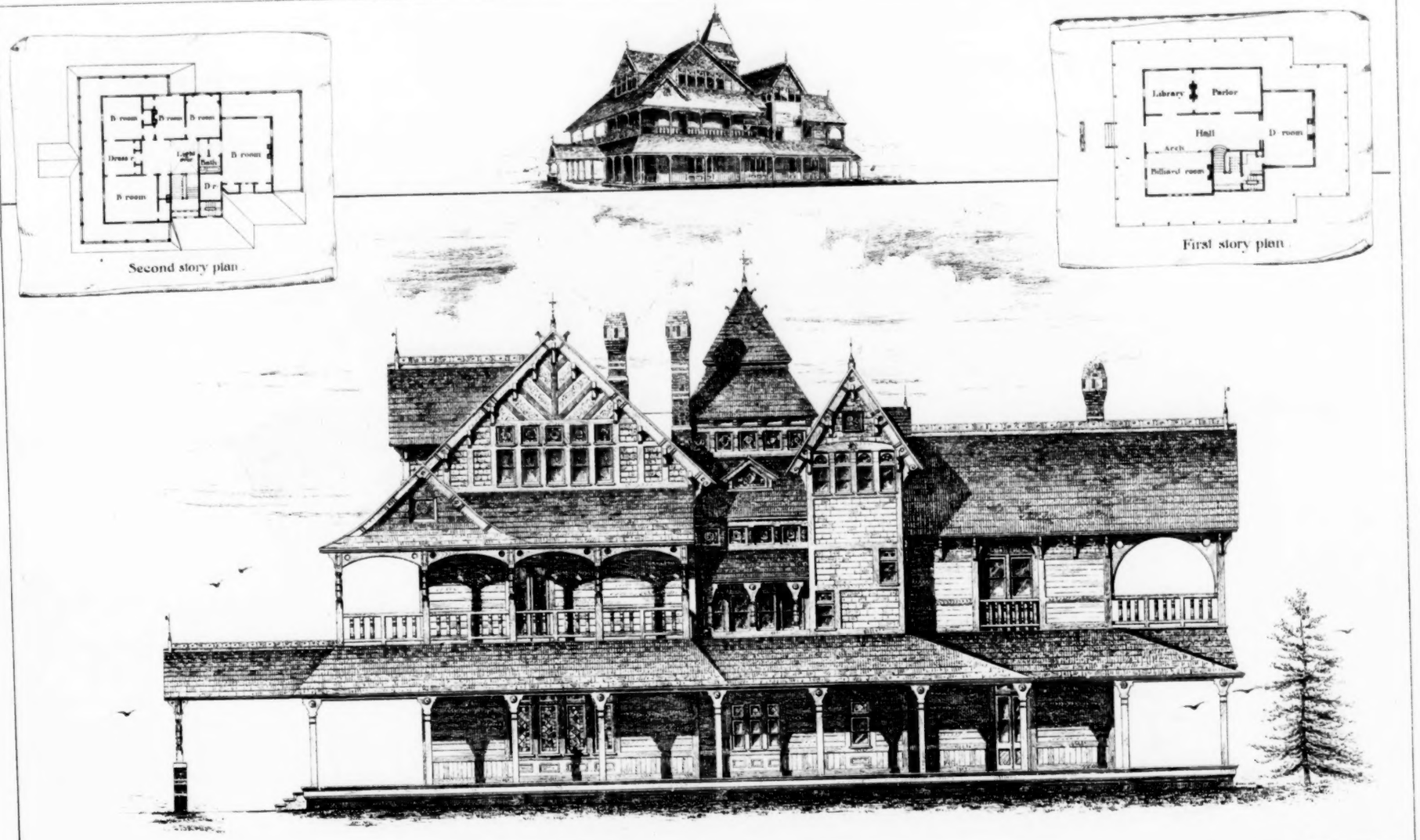
HELIOTYPE JAMES R OSGOOD & CO BOSTON



HOUSE AT RIDER'S CROSSING, BEVERLY FARMS, FOR GEO. A. GODDARD ESQ.

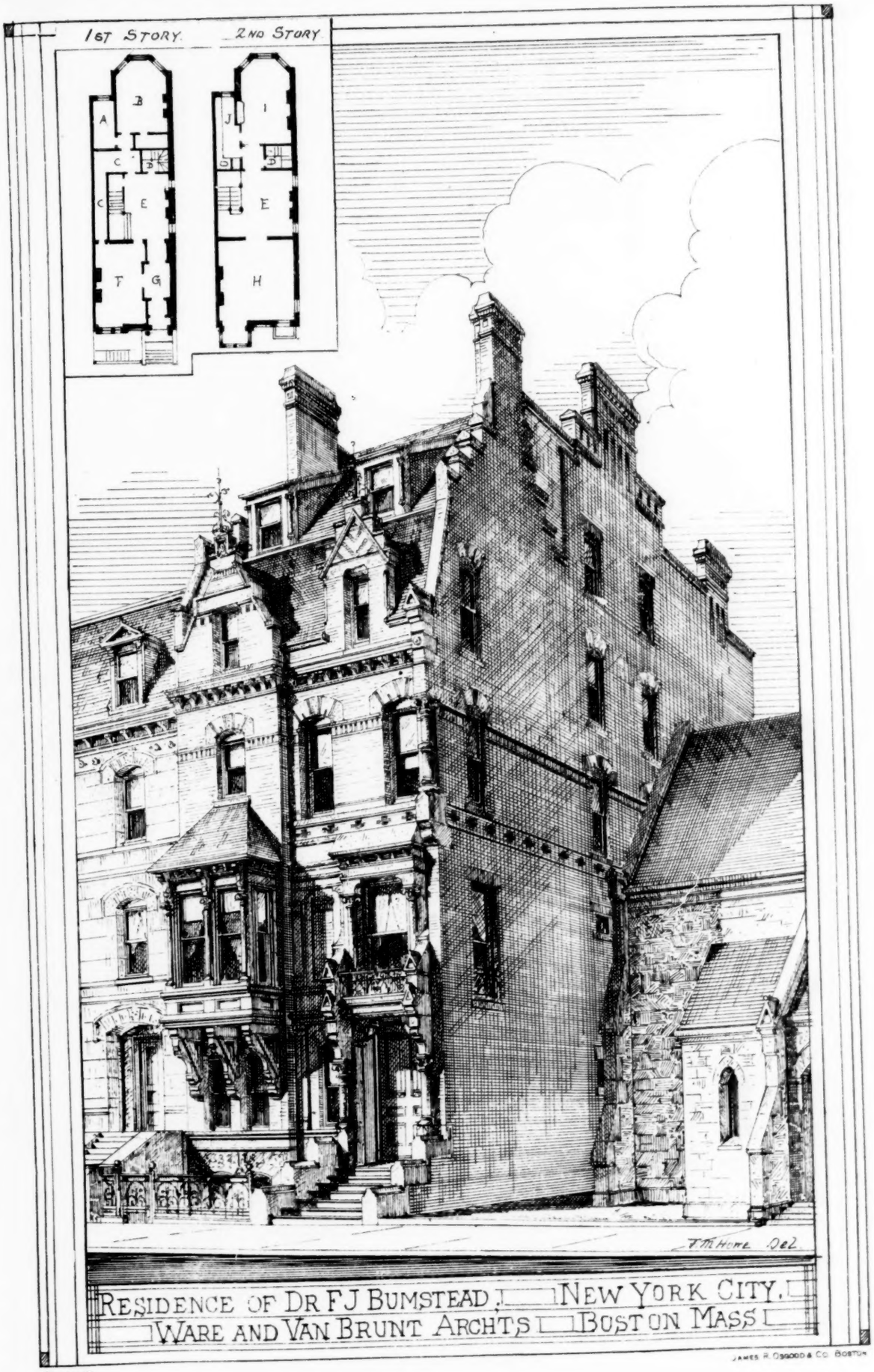
D. C. CABOT AND F. W. CHANDLER, ARCH'TS, BOSTON.

HELIOTYPE



West Elevation of House for Bryce Gray, esq., Long Branch, N.J. Potter & Robertson, Architects, New York.

HELIOTYPE
JAMES R. OSGOOD & CO., BOSTON



RESIDENCE OF DR F J BUMSTEAD, NEW YORK CITY.
WARE AND VAN BRUNT ARCHTS BOSTON MASS

JAMES R. OSGOOD & CO. BOSTON

HELIOTYPE

by Edward H. Dougherty, the foreman of mechanics, and no prior inspection or acceptance was had.

"Immediately upon moving the props, the failure of the truss was demonstrated. On the Saturday prior to the Tuesday on which the disaster occurred, the completion of the work was reported by the foreman Dougherty to the supervising inspector. With an injunction to avoid any sudden shock or jar to the truss in removing the props, the matter was left in the foreman's hands. A prudent suggestion was made to the supervising inspector from Mr. Haven, of the firm of contractors, that the roof-beams, owing to their deflection and the length of span they traversed, demanded the support of still another truss, to be placed midway between that furnished by them and the western wall of the building. This suggestion was apparently disregarded. On Monday the Supervising Architect and the supervising inspector passed through the fifth story of the building, and the attention of the former was casually called to the new truss. He expressed no criticism upon it, and subjected it to no examination. In brief, the accident may be said to have resulted from the adoption of defective work, without previous inspection or approval by any qualified person.

"Neither Dougherty nor Oakshott was a professional architect or engineer; and neither of them could claim or did claim when before us to be capable judges of the sufficiency of the truss. It seems to us that if the Supervising Architect cannot personally superintend all the structures under his charge, then the position occupied by the supervising inspector should be filled by a person of professional attainments superior to those of its present incumbent. The Supervising Architect in this case seems to have put a confidence in the supervising inspector to which, from his skill and judgment, he was not entitled; and the supervising inspector, in turn, to have been similarly over-confident in his foreman. It may at least be suggested that the government has either shown an excess of confidence in the persons selected for the position of supervising architect, or has imposed upon him an excess of duties. We are willing to believe the latter to be the case. It is proper to state that the supervising inspector was found by the present Supervising Architect, when he succeeded to the position, in the exercise of the duties of the place, and was retained by him. It is a painful task, in view of the calamitous result of the imperfect work, to reflect upon individuals. It is a responsibility, however, that we are not at liberty to avoid. Our limited time has not enabled us to make an exhaustive examination of the degree of risk — if any exists — of the recurrence of such an event as that of the 1st of May.

"We are unable to pronounce emphatically upon the propriety of such a departure from the original design of the structure, as that which was made by the former Supervising Architect, in removing the partition-walls which originally divided what is now this court-room, without at once removing the corresponding wall above it, and adopting some substitute to receive the superimposed weight. In our opinion, although not the immediate cause of the disaster, it was a grave error. Neither are we able with confidence to express an opinion upon the question whether the roof is unnecessarily over-weighted with concrete, or the beams and girders subjected to a strain beyond their capacity. We are induced by the moral evidence before us urgently to recommend that these and similar questions involving the security of the building should be properly determined by thorough examination, to be made by a commission of technical experts. Its result, if it should be merely to allay apprehension, would be valuable, while if it should suggest the necessity of modifications to insure safety, the most speedy and efficient action in this direction should be undertaken. By a unanimous vote of the grand jury, this presentment is directed to be signed in their behalf by their foreman and secretary, and the same is done accordingly. JOHN H. UHL, *Foreman.*"

The opinion of the Treasury Commission is of more value, as coming from a company of experts whose attention was confined to the causes of the accident, and the conditions under which it took place. The *personnel* of the commission were: architect, George B. Post; ironworker, A. J. Campbell; builder, Samuel Lawden; superintendent of buildings, W. W. Adams; architect, D. Jardine; carpenter, W. H. Gedney; mason and builder, William Laimbeer, *chairman;* engineer and architect, Theodore Weston, *secretary.*

The workmen and architects were examined, excepting A. B. Mullett, who sent when summoned a long letter endeavoring to show "that the present unfortunate disaster was in no form or manner due to any fault or imperfections, either in the original designs, the working-drawings, or the practical execution of the same." As the commission needed facts and not opinions, the letter was not received. The report of the commission opens with a letter from Mr. Mullett of July 11, 1874, directing the changes for the creation of the new court-room.

"In order to carry out the instructions of Mr. Mullett, a tier of beams constituting the then fourth floor was removed from the space now occupied by the United States Criminal Court Room in order to give it increased height of ceiling, and a brick partition wall then dividing the room transversely was removed to increase its length. This brick wall which had also extended through the attic story of the building, and carried a portion of the roof, was under these instructions required to be supported above the ceiling of the court-room by a wrought-iron girder, introduced at the time the wall was removed. The insufficiency of this girder proved to be the primary cause which finally led to the sad catastrophe of May 1. . . . No copy of the plan referred to in Mr. Mullett's letter can be found in the office of the New York Superintendent, nor does any record there appear of a written description or specification for this girder; consequently it is not possible for your commission to determine whether the design for the girder was made or approved by the officials of the Washington office of the Supervising Architect. The engineer of that office, Mr. Schumann, asserts that he never knew the dimensions of this girder nor the method of its construction. . . . At a subsequent period, the precise date of which no testimony absolutely establishes, the girder was discovered to show signs of weakness, as an opening about fourteen feet wide and ten feet high was taken out of the attic wall to relieve it. When the court-room ceiling was furred and plastered (apparently in the winter of 1874 and 1875) the girder was hidden from view. Subsequently the ceiling cracked, and fractures were noticed in the brickwork at the jambs of the opening of the attic wall above; and it appears that Mr. Oakshott, the present supervising inspector in charge, directed the attention of Mr. Schumann as well as of Mr. Mullett to the condition of both ceiling and wall, and suggested that the whole wall should be removed and that its place as a support for the roof deck should be supplied by a truss, and that Mr. Mullett agreed to recommend the substitution to Mr. Hill, the present Supervising Architect.

"The following extract of a letter from Mr. Mullett to Mr. Hill is in compliance with that promise: —

NEW YORK, Dec. 2, 1876.

JAMES G. HILL, *Esq., Supervising Architect.*

Sir, — In making alterations in the original designs to provide for the Criminal Court Room, a brick partition was left in the fifth story, supported by a beam that was not suitable and should have been condemned. It subsequently settled and caused a crack to appear in the ceiling of the court-room. Efforts were made to remedy this by the late assistant superintendent, by having a large opening in the wall. This is not, however, an effectual remedy; and I earnestly recommend the removal of the wall and the insertion of a roof-truss as in the other cases. Very respectfully, A. B. MULLETT,

Supervising Architect New York Post Office.

"On April 2, 1877, Mr. Oakshott addressed the subjoined letter to Mr. Hill: —

APRIL 2, 1877.

JAMES G. HILL, *Esq., Supervising Architect, Washington, D.C.*

Sir, — You will no doubt remember that during one of your recent visits to this building, I called your attention to the settlement of a brick wall dividing the large room in the fifth story (now used as a dormitory), and directly over the Criminal Court Room. I have carefully noted the settlement, and find that the cracks in the court-room ceiling, caused by the same, are increasing, and it is necessary to remove the wall at once, substituting as a support for the roof an iron truss of the same design as those now in position in the adjoining rooms. These trusses were supplied by the Kellogg Bridge Company, at a contract price of $438.67 each. Enclosed please find proposal of Messrs. Heuvelmann, Haven, & Co., for supplying the additional truss for the sum of $233, which it will be seen is $205.67 less than the contract price of the Kellogg Bridge Company. In view of the emergency of the case, I have accepted the proposal of Messrs. Heuvelmann, Haven, & Co.; and as the work is properly preservation and repair of a public building, I would respectfully request that the expenditure be authorized from that appropriation. Very respectfully, T. H. OAKSHOTT,

Supervising Inspector in Charge.

"Mr. Hill approved the action of Mr. Oakshott."

The report gives the letter of Mr. Hill and the memorandum of the firm offering to supply the truss, and then briefly describes the setting up of the truss, the removal of the supports, and the fall of the roof. It then says: —

"A comparison of the fallen truss with the one adjacent and now standing, which was to be copied in the construction of the new one, reveals the fact of several important differences. (A plan of the model truss, made from actual measurement, taken by this commission, is appended to the report, also a plan of the new truss, similarly measured as it now lies). The rafter with its ties and braces to the vertical strut is wholly omitted, and this strut, being neither bolted to its shoe nor built into the wall, stood free without lateral support. The roof beams instead of abutting into and consequently bracing the upper chord in the new truss, as they did in the original and adjoining one, simply rested upon it and were not secured to it in any way. The new truss was also of about nine inches less depth, and consequently its proportion of superfluous strength (the factor of safety) was correspondingly reduced without lateral support.

"An examination of facts and measurements and computations made by the commission prove, first, that the girder introduced under the wall when the alteration was made in the United States Court Room was so insufficient for the purpose that it must have long ago failed, had it not been for the fortunate fact that the brick wall which it supported was a particularly sound and strong one, and that it proved to be not only practically self-sustaining, but also (on the principle that it contained a natural arch), to have been able to hold the weight of the roof besides; and that the said girder is so insufficient in proportion that when now relieved, as it was by the wall, from all the weight of the roof, and all the weight of that portion of the wall itself above its natural lines of fracture, which runs at an angle from the extreme ends of the girder, nothing but the fact that it happened to be constructed of exceptionally good iron, and that the floor above it has never been loaded by an ordinarily great weight, has prevented the Criminal Court Room beneath from having been the possible scene of a far more serious accident than that which has now occurred in the room above it. The girder has now a deflection of five and a half inches, with a length of thirty-five feet two and a half inches between its bearings. The extent of the cracks in the ceiling of the Criminal Court Room did not necessarily indicate the exact curvature of and consequent danger from the girder; for the ceiling has some self-sustaining power independent of the floor on which it is hung, as is proved by the fact that many of its suspending rods are loose. (The floor has sagged in places more than the ceiling.) As the strength of the girder is impaired, although the main load it was intended to carry is removed, and as under no condition is it strong enough to support with a sufficient margin of safety that portion of the floor alone which it is still called upon to carry, your commission recommend that it be either materially strengthened, or that its place be supported by a new and properly proportioned girder.

"The wisdom of the order to remove the wall and supply its place with a truss is manifest. The roof trusses adjacent to the truss that failed, which carry substantially the same load, are proved to be sufficient to support the roof with safety. The letters of April 2 and 3 from Mr. Oakshott, superintendent, to Mr. Hill, Supervising Architect, and of Mr. Hill to Mr. Oakshott, prove that a contract was authorized for a truss which would have been adequate to safely support the roof.

"The fact that important elements of stability and strength in the model truss are not found in the new truss explains its failure. The omission of a rafter with its bracing, which was a main reliance for the safe support of the end of the horizontal portion of the truss above it, was the primary cause of the accident. Its omission left the whole weight of one-half of 573¾ square feet of roof, with its iron beams, corrugated iron arches, and unnecessarily heavy concrete, also of the metal roofing and accidental load, to be borne by a single strut 19½ feet long, formed of the 6-inch channel bars. Placed back to back, 3½ inches apart in the first 14 feet, 8 inches of which form the base, there are but two separations, through each of which passes a three-quarter inch bolt. The strut stood absolutely free and without lateral bracings. It was manifestly utterly incapable of sustaining the load placed upon

it, and, as might have been expected, crippled, bent sideways, at a point three feet below its union with the truss. As no provision was made to brace the top chord of the truss laterally, either by bolting the deck beams of the roof to it directly or with angle irons, or by notching them on to it, it was deficient in lateral stiffness and in danger of failure, of crippling the upper chord.

"Finally, the present accident is due to two causes:—

"*First:* That the truss erected did not correspond with that recommended by Superintendent Oakshott, approved by Supervising Architect Hill, and *apparently* contracted for by Messrs. Heuvelmann, Haven, & Co.

"*Second:* That the shores were removed, and the truss was subjected to its load, before it was examined by a person competent to determine if it was constructed in conformity with the contract.

"Your Commission considers that it is perhaps a fortunate circumstance that this accident, sad as it is, has led to the detection of the radical weakness of the hidden girder of the ceiling of the United States Court Room, the continuance of which is now a source of jeopardy, and the community have great reason to be thankful that they have been spared the details of a calamity far more appalling in its character."

FALL OF THE WINNEBAGO COUNTY COURT HOUSE AT ROCKFORD, ILL.

CHICAGO, May 12.

YESTERDAY at half-past eleven in the morning, the greater part of the interior walls and roof of the Winnebago County Court House in course of erection suddenly fell without warning, burying in the ruins nearly all the workmen employed on the building. The daily papers report that eleven were killed and ten mangled, some of whom may die. The contractor and superintendent had a narrow escape. They were left on the walls, and had to be rescued by ladders.

The architect of the building is Henry L. Gay of Chicago; the contractor for the whole W. D. Richardson of Springfield, who also had the contract for the State Capitol, and for the prison labor of the convict stonecutters at Joliet. The superintendent was F. E. Latham of Rockford, who was also a County Commissioner of Winnebago County, and a member of the building-committee.

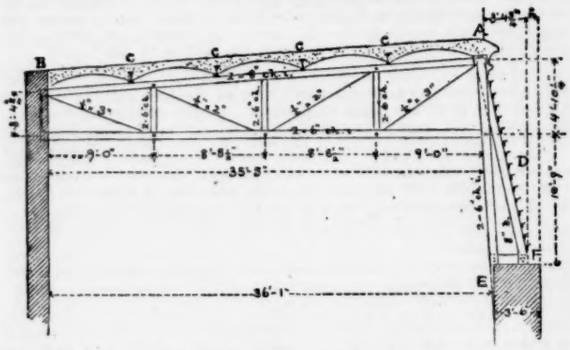
The County Commissioners advertised for plans in competition in the spring of 1875, and Mr. Gay was selected as architect over thirteen competitors. The contractor Richardson was awarded the work, and commenced the building early in 1876. Mr. Gay did not superintend the building, but made stated visits whenever called on for consultation. The superintendent was appointed by the building-committee.

Mr. Gay had not visited the building for three months, and at the time of the disaster was at Geneva Lake. The only information to be had is such as can be gleaned from the despatches which are from unprofessional sources, and do not contain sufficient technical information to form the basis of a deliberate judgment as to the actual cause of the downfall. From such sources as are at present accessible I have ascertained that the building is a rectangle faced on all sides with Athens limestone, having a high basement above ground, and two stories. The exterior is quite elaborate, having long pilasters on the piers running through two stories with a heavy stone cornice. The main entrance is a very high arch rising above the roof line, and supported on each side with clusters of long columns. The doorway is deeply recessed, and above the arch the work is carried up square all around and surmounted by a stone cornice. There was much heavy and elaborate carved stonework at this point, and above it rose or was intended to rise a square dome, which was only for exterior effect. About one-half of the stone wall supporting the dome was carried on brick walls in the attic story supported on iron girders and two cast-iron columns which stood in a large court-room. The columns were under the angles of the dome, and about thirty feet long. They stood on brick and stone piers running down to the foundations from the level of the second story floor. The accounts seem to indicate that these piers gave way first. The interior construction was intended to be fire-proof throughout. The contract for the whole work is nearly $200,000. At the time of the catastrophe, the last course of stone had just been set on the square brick tower supporting the dome. It is presumed that nearly the whole interior is a perfect wreck, and possibly the exterior walls may be seriously injured. I will endeavor to give you next week a more detailed account from personal observation. Thus far it is impossible to say whether the accident is attributable to defective planning or bad workmanship or both, or to estimate the extent of the damage. It is the most serious disaster of the kind that has ever occurred in the State, and has caused an intense excitement in its immediate locality.

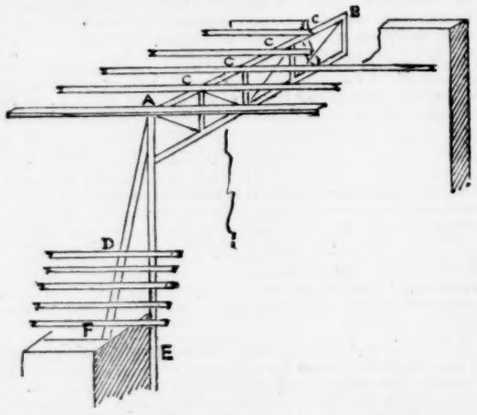
THE ROOF TRUSSES OF THE NEW YORK POST-OFFICE.

A CORRESPONDENT in Washington has sent us a description of the trusses of the New York Post Office, to which the one that gave way on the 7th inst. was supposed to be similar; and from it we extract the following analysis, illustrated by the diagrams which accompanied the letter: —

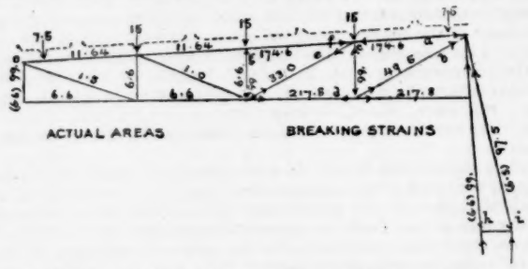
The ultimate strength of the bar "b," which is in tension, is 33 x 1.5 = 49.5 tons. Using this strain in constructing a stress diagram, not shown here, we find the corresponding stress upon the adjacent strut to be 22.5 tons; and to this strut will be transmitted half the load upon the truss, provided it is uniformly distributed; therefore the load which if uniformly distributed would break the bar "b," and consequently the truss, would be 2 x 22.5 = 45 tons. Such a load would be represented by a weight of



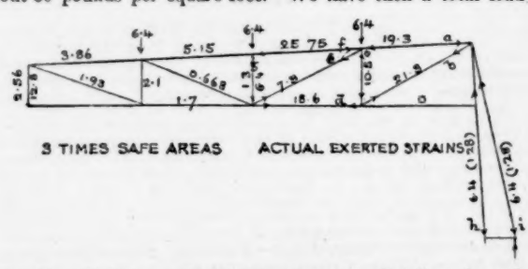
sixty tons: this divided among the four panels of the truss, would give fifteen tons to each panel; and since half the weight in the extreme panels is transmitted directly to the supports, 3 x 15 = 45 tons



of the weight remain as the load on the truss. Hence we may assume that a weight of sixty tons of roof would be enough to break the truss. The truss carries about 640 square feet of roof, of which



therefore the breaking weight would be $\frac{120000}{640}$ = 187.5 pounds per square foot. What the truss has really to carry is a weight of about 80 pounds per square foot. We have then a total load of



640 x 80 = 51,200 pounds (25.6 tons) equally distributed, or about 42 per cent of the actual breaking strain of the truss.

The annexed diagrams exhibit clearly, one the actual areas and the breaking strains of each member of the truss, the other three times the safe areas and the strain to which each member of the truss was actually subjected.

STREET-CLEANING IN PARIS. — It is said that it costs a million dollars a year to keep the streets of Paris clean.

THE FALL OF THE ROOF OF THE NEW YORK POST-OFFICE.

NEW YORK, May 14, 1877.

THE report of the secretary's commission and the verdict of the coroner's jury are so at variance with each other, that it seemed to me your readers would be glad of a plain statement of facts on which they could form their own judgment.

The existing state of the case previous to any of the work resulting in the accident was this: A room in the fifth story, with mansard roof of iron purlins and slate, and deck roof of I-beams, corrugated iron arches, concrete, cement, and copper covering (see fig. 1). The I-beams rested on the outer walls **A B** and **I K**, and on the partition wall **C D**, and were framed into the top chord of the truss **E H**. It will be seen from the diagram that the truss **E H** and the partition wall **C D** had practically each the same amount of roof to carry; the partition wall **C D** rested on two 15-inch I-beams bolted together to make a girder (fig. 2, **T**). This girder also carried the floor-beams (**W**, fig. 2) of about 455 superficial feet of floor, and was not sufficient for the purpose. It appears in evidence that the partition wall **C D** originally rested upon a wall extending from the foundation, that this wall in the fourth story was removed to enlarge a court-room, and that the girder (**T** fig. 2) was inserted to supply its place by Mr. Steinmetz on general authority, and without consultation with the engineer of the department. Cracks appeared in the ceiling below, and it was supposed that the weight of the wall upon the girder was causing it to deflect; but subsequent investigation seems to show that the weight of the floor instead of the wall caused the deflection. It was however decided to remove the wall **C D**; and a contract was made with a New York firm to make and put in place a truss exactly like truss **E H** (figs. 1 and 3), which was in plain sight. This truss **E H** was in general terms made as follows; top chord, two 8-inch channel-beams, back to back, about one inch apart; bottom chord, two 6-inch channels; tension-bars, 3 x ½ inches; outer support, a figure 4 of 8-inch I-beam, and double 6-inch channels. This truss has been shown by proper calculation to be ample in strength for all it was called on to do, and also by the fact that it stood the severe wrenching of the fall of the other part of the roof; and had the contract been carried out, and the new truss been the same as the old one, there could have been no trouble. But there were three vital defects in the making and putting up of the new truss, either of which would probably account for its failure.

1st, It was deemed inexpedient to disturb the roof by attempting to frame the roof beams into the upper chord of the new truss, as they are in the old truss **E H**. The truss was therefore made nine inches shallower than the model or old truss, and the roof beams were allowed to rest *on* the chord, but were not in any manner fastened *to* it. This makes the first mistake.

2d, The makers paid no attention to the *sectional* area of the iron used, but appear to have thought that nominal sizes expressed strength: so they substituted for the original 8-inch channel-bar, ½-inch web, sectional area about 6½ inches, a 9-inch channel-bar, ¼-inch web, sectional area only about 5¼ inches. They did this evidently intending to compensate for the *decreased* depth of truss by an increased depth of top chord, — good intention, but poor practice. This was the second mistake.

3d, The old truss was mainly supported at one end by (see fig. 3) an 8-inch I-beam, which, following the incline of the roof, rested on the front wall, and was secured to the channel-bar supports **M** by two 6-inch channel-bars **N**, making a figure 4. The 8-inch beam **L** was also greatly braced by the 2-inch angle purlins ten inches apart, which connected it with other rafters.

In the new truss (see fig. 4) this support was entirely omitted, and the truss rested wholly upon two light 6-inch channel-bars some 18 or 19 feet long. As soon as the shores were removed the inevitable consequence followed; that is, the channel-bars **R** buckled under the weight, and bent to nearly a right angle at **S**, and the whole roof expected to be supported by that truss fell.

There is an important error of statement in the papers in regard to the weight of roof, which I am able to correct, having had the opportunity to make accurate examinations upon the ground. The beams used were 9-inch heavy beams, 30 pounds per foot; there were three inches of concrete at the crown of the arch, but not therefore, as your last week's correspondent states, twelve inches at the haunches (from which you would infer there was an average of 7½ inches). The actual springing of the arch is about two inches above the bottom of the beams. Then the arch takes out from the average the segments of a circle made between the crown and the springing of the arch on each side, so that by actual measurement the average of concrete was 4¼ inches. The weight of the roof then was as follows per superficial foot:—

I-beams	4 lbs.
Corrugated arch	3 "
Concrete, 4¼″ @ 125 lb. per cub. ft.	45 "
Portland cement, 2″ @ 80 lb. per cub. ft.	14 "
Copper	1½ "
	77½ lbs.

The roof was calculated with a factor of safety of 3 for 60 pounds per superficial foot, and of course was perfectly safe at the above weight.

The weight was about 35 pounds per foot *less* than it would have been had a brick arch been used. There were two remarkable facts shown in this matter, one of which you mention in your last week's article, — viz., the strength of the floor upon which the roof falls. Fifty tons fell upon the floor, a distance of some 18 feet. The shock must have been tremendous, and the beams are of course badly bent, having a permanent deflection of 5½ inches; but they did not go down, showing there was abundant ultimate strength in them.

The other fact was the strength of the ceiling under this same floor, and which was hung to it.

The plaster-work upon it was of the most elaborate nature. Notwithstanding the great deflection above mentioned, and the enormous shock, not a piece of plaster on this lath fell. The clinch seems to be a very perfect one.

The following facts thus seem to be developed: —

1st, A supporting wall was taken out; and to furnish supports for what this wall had carried, a girder of two 15-inch beams was put in its place: this was in the fall of 1874.

2d, This girder was insufficient for its work, which was mainly the support of a large area of floor.

3d, The remedy was not to take down the partition wall, which added but a small percentage to the total weight, but to strongly truss the weak girder.

In regard to the immediate accident, the following was shown: —

1st, A truss was contracted for a few weeks since, to be made and put up precisely like another truss already in place and doing the same work and in plain sight.

2d, The contractors omitted two vital points and changed one essential point.

3d, The shores appear to have been removed before there was any official inspection, and acceptance of the work.

UNTRUSTWORTHY ESTIMATES.

TO EDITOR OF AMERICAN ARCHITECT AND BUILDING NEWS.

In your issue of April 21, there is something said concerning the "unreliable estimates" given by architects. Now I propose to show why these estimates (which are correct at the time they are made) so often prove unreliable and generally too low.

In the first place, a person goes to an architect and says, "I want a building" thus and so (giving about the amount of room required); "I don't want any gimcracks or unnecessary ornament about it: now what do you think it will cost?" Of course the architect is prompted to give a guess; and that rude guess the person carries out and quotes as if it were a careful estimate from the architect.

It must be remembered that nine-tenths of our patrons talk so as to make their desires appear small, while the architect is making his preliminary drawings; but as the drawings progress, a great many little things are introduced at the suggestion of the owner which he did not contemplate having at first.

Finally the drawings and specifications are completed, and they include not only the amount of work orignally estimated, but all these little things which the owner thought he did not want at first, but which he has insisted upon having put in, one after another, as the drawings progressed. Perhaps he has enlarged the house two or three feet on one side for the benefit of one particular room, and one foot more on the end to enlarge some other room: this enlargement makes the house cover nearly twenty per cent more surface of ground; but to the owner's mind, only two or three feet on a side and one foot on the end will not make *much* difference.

But all these little alterations and additions add very materially to the cost, and the architect is blamed for "unreliable estimates" because the house covering 2,500 feet of surface cannot be built for the same price that the house first talked of covering 2,000 feet of surface would cost.

Perhaps the owner thinks that stucco cornices would look well in the chambers, and since mantles are pretty cheap, he concludes to put them in all the chambers. He did not want any of these things at first. Now who is to blame if the cost figures up larger than was at first calculated?

The owner well remembers the sum the architect guessed the building would cost, but he forgets that he did not want all these things at the time of that estimate.

These are some of the ten thousand reasons why people find architects' estimates unreliable.

Yours respectfully,

A PRACTITIONER.

ARCHITECTURE AT CORNELL UNIVERSITY. — President White has recently purchased for the Architectural Department of Cornell University over three hundred large photographs of French architecture, and nearly one thousand photographs of different periods of Italian architecture. He has also purchased a large number of chromatic and other reproductions of the interior and mural decorations of Pompeii and of many edifices from cities of more modern date. The University Library will be further enriched by the best French and German works on Pompeii.

NOTES AND CLIPPINGS.

FALL OF A BRICK BUILDING. — A large six-story brick building in Alleghany, occupied as a manufactory by the Excelsior Coffin Works of Hamilton, Lemmon, Arnold, & Co., fell with a terrific crash about noon, May 10. Fortunately there were but few persons in the building, and these, with one exception, escaped death, although some were severely bruised and cut. Mr. Eugene McGeary, a contractor engaged in making some repairs on the building, was buried in the ruins, and up to midnight his body was not recovered. The precarious condition of the walls and portions of the building yet standing renders search impossible until they are braced to prevent further accident.

FALL OF A BUILDING. — Part of the wall of a building on the corner of Chestnut and Third Streets, St. Louis, owned by Col. George Knapp, while being pulled down May 14, fell and carried five men to the ground with it, injuring all more or less.

UNSAFE BUILDINGS IN CHICAGO. — One of the architects of Boston has recently returned from a visit of inspection to Chicago, where he went as the representative of capitalists who hold mortgages on buildings which have have represented to be in a bad condition. It is said that the buildings erected after the great fire were constructed with great haste and in such a manner that many of the finest stores have been injured by dry rot. Large green timbers were covered in, and by the addition of paint were so incased as to be air-tight, and the rot has been so active that the buildings are unsafe. Some of the stores are being strengthened in various ways, for the supports were inadequate.

MONUMENTS. — The New London County Historical Society has received the design of the monument which the society proposes to erect as a memorial of the defeat of the Pequots, and the destruction of their famous stronghold near Mystic. It consists of a granite shaft of the Ionic order, standing on a rectangular base of the same material, ornamented with bronze tablets of elaborate designs, and the whole surmounted by a colossal statue of the hero of the battle, Capt. Mason, who led the little band of colonists in the hazardous conflict. The estimated cost of the monument is $5,000.

The corner-stone of a monument dedicated to the Confederate dead was laid at Chattanooga, Tenn., May 10, with Masonic rites. A detachment of United States troops, with the Second Infantry Band at their head, participated. The people joined in decorating the graves of Confederate soldiers amid the utmost good feeling.

STONEWORK FOR THE ST. LOUIS POST OFFICE. — There are about 350 men employed in the granite-quarries at Hurricane Island, Me., who are at work on the St. Louis Post Office contract. Each of the window-caps takes two men six months to finish, weighs about four tons, and costs $1,700. The caps (about two feet square) which cover the pilasters cost $1,500 each. There are seventy-five in all, and it takes a skilled workman from ten months to a year to make one. The quarries have been worked for this building a year, and it will take two or three more before it is done.

THE STEWART MEMORIAL CHURCH. — The Stewart Memorial Church at Garden City, L.I., which is to stand as a monument for Mr. A. T. Stewart, and is to contain in its basement a mausoleum for his remains, is rapidly rising upon the foundation, which was completed on the 1st of November last. The walls are at present ten feet high all around, and the date of its completion is positively fixed for August, 1878. The extreme length of the church, or cathedral as it is called, is 143 feet outside of the buttresses. Its height to the ridge of the roof is to be 69 feet; to the top of the spire, 204 feet; the width of the transept, 75 feet; and across the body of the church, 50 feet. The outside is to be built of Belleville and the inside of Berlin and Ohio stone.

THE DRAINAGE OF NEW ORLEANS. — The *Commercial Advertiser* says that the present drainage of the city of New Orleans is carried on by means of four draining machines or engines, located in different sections of the city, so that the water which falls on the different sections, together with a large part of the sewage, is conducted by open gutters and ditches to the draining point, whence it is lifted by machinary to the level of Lake Pontchartrain, into which it is discharged through the agency of a tail-race connecting the draining machines with the lake.

THE WEIGHT OF BUILDINGS. — It has been calculated that the pressure per square foot of the superstructure upon the foundation walls of a few of the best-known buildings is as follows: —

The new dome of the United States Capitol at Washington	13,477 lbs.
Girard College, Philadelphia	13,440 "
St. Peter's, Rome	33,330 "
St. Paul's, London	39,450 "
St. Genevieve, Paris	60,000 "
Le Toussaint, Angers	90,000 "
While the pressure per square foot upon the earth is in the case of St. Paul's, London	42,950 "

DESTRUCTION OF A PERUVIAN TOWN BY AN EARTHQUAKE. — A despatch received from Valparaiso states that the town of Iquique has been destroyed by an earthquake and tidal wave. Iquique is a small seaport town of Peru, in the department of Arequipa, on the Pacific coast. The population is somewhat over 1,000.

ENGLISH ART ACADEMY AT ROME. — It is now seriously proposed to establish in Rome an English art academy similar to the French academy at the Villa Medici.

CHAPEL-BUILDING EXTRAORDINARY. — The Wesleyans in England propose to raise funds for the erection of a thousand new chapels to be built at the rate of a hundred a year.

A HEAVY BLAST. — At a quarry near St. Blazey, Cornwall, a heavy blast lately threw down about 700 tons of granite, causing very little breakage. One block, without flaw or discoloration so far as can be seen, contains about 8,000 cubic feet or nearly 600 tons. There are several smaller fragments which weigh from 30 to 60 tons each.

POPERY OR NO POPERY. — The Established Church of England is agitated just now as to whether it is allowable to use brass eagles with outspread wings as lecterns. The opponents to the custom, which is quite a common one, say that as in heraldry the eagle with outspread wings represents a prince of the Roman Empire, i.e. the Pope, its use is not to be tolerated. The supporters of the custom see in it only a symbol of the Evangelist St. John.

THE ROYAL CHAPEL, WHITEHALL. — It is said that the walls of the Royal Chapel, Whitehall, have not received a coat of paint since the reign of King William IV. more than forty years since; also that the organ is so much out of repair that many of the pipes are tied together by strings.

THE COSSALL GIANTS. — A monument has just been erected at Cossall near Nottingham to the memory of three famous soldiers known as the Cossall giants, because they were all men of extraordinary stature, and distinguished themselves in charging Napoleon's guard at Waterloo. It is recorded that Shaw, of the Life Guards, killed ten men with his own sword before he was himself killed. The monument is a marble obelisk fifteen feet high, at whose base is sculptured a life-guardsman's armor.

FIRE AT THE CATHEDRAL AT METZ. — On May 6, during the service in the Cathedral at Metz, at which the Emperor William, the Crown Prince, and Gen. Von Moltke were present, the interior decorations were ignited by the careless use of fireworks burned in honor of the visitors; and before the fire could be extinguished the roof was burned, and much of the interior damaged. Another account states that the fire broke out at four o'clock in the morning, and was caused by the illuminations.

THE FRENCH PULPIT FOR ST. PAUL'S. — The Dean of St. Paul's Cathedral has written to the Lord Mayor to say that the carved pulpit valued at £1,400, which is offered by the *Chambre Syndical des Ouvriers Menuisiers en Bâtiment* will be gratefully accepted, and promises that it shall be placed in the nave of the cathedral.

CANTERBURY CATHEDRAL. — About $75,000 are needed to carry out the proposed restorations.

THE GOBELINS. — The commission which was appointed by the Minister of Public Instruction to report on all questions relating to the future prosperity of the manufactory of the Gobelins has offered the following recommendations: In future no tapestry will be produced at the Gobelins except from designs especially prepared. The designs are to be obtained by public competition in accordance with programmes issued by the commission. An annual competition is to take place between students in the Gobelins school who have served three years apprenticeship, the successful competitor in which is to follow the course at the *École des Beaux-Arts* for two years at the expense of the state. The drawing-classes at the manufactory are to be extended, and the students are to be taught the theoretical principles which govern the art of tapestry-making. The process of reproduction is to be simplified. The manufacture of velvets is to be restricted to wall-hangings, the chemical course as applied to dyeing is to be re-established, and the laboratory opened to out-door students.

ORIGIN OF PETROLEUM. — M. H. Byasson has been led by the following experiment to give a scientific explanation of the formation of petroleum: If a mixture of vapor of water, carbonic acid, and sulphuretted hydrogen be made to act upon iron heated to a white heat in an iron tube, a certain quantity of liquid carburets will be formed. This mixture of carburets is comparable to petroleum. The formation of petroleum can thus be naturally explained by the action of chemical forces. The water of the sea, penetrating into the cavities of the terrestrial crust, carries with it numerous materials, and especially marine limestones. If the subterranean cavity permits these new products to penetrate to a depth where the temperature is sufficiently high, in contact with metallic substances, such as iron or its sulphurets, we have a formation of carburets. These bodies will form part of the gases whose expansive force causes earthquakes, volcanic eruptions, etc. Petroleum is always found in the neighborhood of volcanic regions, or along mountain chains. In general it will be modified in its properties by causes acting after its formation, such as partial distillation, etc. Petroleum deposits will always be accompanied by salt water or rock salt. Often, and especially where the deposit is among hard and compact rocks, it will be accompanied by gas, such as hydrogen, sulphuretted hydrogen, carbonic acid, etc. — *Revue Industrielle.*

PORTLAND STONE. — Portland stone is nearly pure limestone. It is denser than the oölitic limestones, weighing from 135 to 147 pounds per cubic foot. To this series belongs the well-known Caen stone, which is obtained from quarries in Normandy. It has been used in England since the time of the Norman conquest, and in Ireland from a possibly more remote period. It is not however to be trusted for external use in England at the present time.

FOREIGN THEATRICAL DISASTERS. — It is said that in 1772 about eight hundred people lost their lives in a burning theatre at Amsterdam; the burning of the theatre at Saragossa, Spain, during the same year, caused the death of nearly one thousand persons; in 1781, nearly five hundred persons were burned to death in the Palais Royal; when the Café d'Istria Theatre fell and took fire, nearly one thousand persons were crushed and burned.